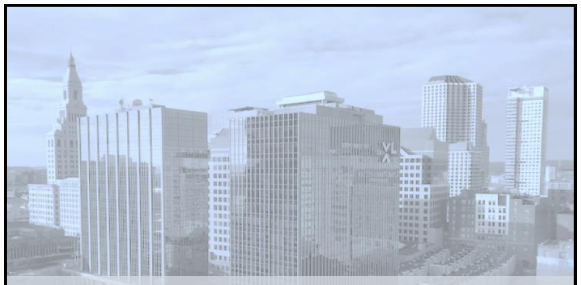

Commercial Cooking and Grease-Laden Exhaust

Spring 2019 Career Development Series

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Course Objective

The objective of this course is to provide the fire code official with a basic understanding of the current edition of the Connecticut Fire Safety Code and the Connecticut Fire Prevention Code as they relate to commercial cooking and grease-laden exhaust.

2

NIOSH Fire Fighter Fatality Investigation and Prevention Program

Death in the line of duty...

A summary of a NIOSH fire fighter fatality investigation — November 9, 2009

Two Career Fire Fighters Die While Making Initial Attack on a Restaurant Fire –Massachusetts

Revised on November 13, 2009 to update Cause of Death Section.

Recommendation #19: Code setting organizations and municipalities should require all commercial cooking operations to have periodic inspections of their kitchen exhaust systems and require all kitchen exhaust system installers to be certified to nationally recognized standards.

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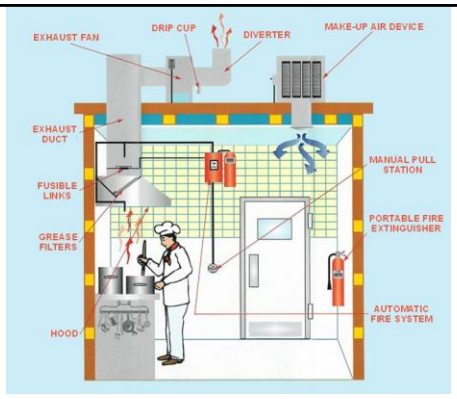

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Hood Types

Canopy Hoods

5

Back Shelf

Pass Over

Eyebrow

6

Applicable Codes

- New Installations
  - IMC covers
    - Design
    - Installation
- All Existing Installations
  - CSFPC covers:
    - Operation
    - Inspection
    - Maintenance

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New Installations

- Section 609.1 (IFC) refers to the IMC.

What does this mean?

8

What is the difference between a Type I and Type II hood?

9

When is a Type I Hood required?

10

The Hood (IMC Section 507)

- Type I hoods are required to be installed over *medium-duty, heavy-duty and extra-heavy duty cooking appliances.*

HEAVY-DUTY COOKING APPLIANCE. Heavy-duty cooking *appliances* include electric under-fired broilers, electric chain (conveyor) broilers, gas under-fired broilers, gas chain (conveyor) broilers, gas open-burner ranges (with or without oven), electric and gas wok ranges, smokers, smoker ovens, and electric and gas over-fired (upright) broilers and salamanders.

11

EXTRA-HEAVY-DUTY COOKING APPLIANCE. Extra-heavy-duty cooking appliances are those utilizing open flame combustion of solid fuel at any time.

MEDIUM-DUTY COOKING APPLIANCE. Medium duty cooking *appliances* include electric discrete element ranges (with or without oven), electric and gas hot-top ranges, electric and gas griddles, electric and gas double sided griddles, electric and gas fryers (including open deep fat fryers, donut fryers, kettle fryers and pressure fryers), electric and gas conveyor pizza ovens, electric and gas tilting skillets (braising pans) and electric and gas rotisseries.

12

Domestic Cooking Appliances

- IMC 507.1.2: Domestic cooking appliances used for commercial purposes must be provided with a Type I or Type II hood.

What does "used for commercial purposes" mean?

13

General Requirements

- Hoods designed to capture and confine cooking vapors & residues (507.1).
- Type I hood must have either automatic controls or an interlock to prevent operation of the cooking appliances when the exhaust fan is not on (507.1.1).
- Interlock between exhaust hood and appliances with standing pilot shall not cause the pilots to extinguish.
- Interlock shall not depend on any component of the fire suppression system

14

Hood Construction (507.2)

- Most new hoods installed are listed, labeled and constructed to IMC or NFPA 96 Standards.

15

Demand Controlled Kitchen Ventilation (DCKV)

16

Provisions for DCKV Systems (507.1.1)

- Fan must activate within 15 minutes after the first appliance is turned on.
- Exhaust volume may be reduced during "part-load" cooking conditions.
- Reduced exhaust volumes must maintain capture of cooking effluents when appliances are operating in stand-by.

17

Type I Hood Clearances (507.2.6)

- Connecticut Amendment
  - 18 inches to combustibles
  - 3 inches to "limited combustibles".
  - Exceptions:
    - Clearance shall not be required from gypsum wallboard or 1/2-inch (12.7 mm) or thicker cementitious wallboard attached to noncombustible structures provided that a smooth, cleanable, nonabsorbent and *noncombustible material* is installed between the hood and the gypsum or cementitious wallboard over an area extending not less than 18 inches (457 mm) in all directions from the hood.
    - When listed or labeled for reduced clearances.

18

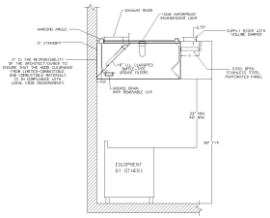
Filters (507.2.8)

- Listed & Labeled.
- Provisions for cleaning and replacement without tools for removal.
- Removal filters must be sized to allow cleaning in dishwasher or pot sink.
- Must not allow grease to drip onto food or cooking surface.

19

Hood Size & Location (507.4.1)

- Canopy
  - 6 inch overhang
  - Max foot distance from top of cooking surface.
- Non Canopy
  - Max 1 foot setback from hood from edge of hood to edge of cooking surface.
  - Max 3 feet above cooking surface.



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Hood Capacity (507.5)

- Exhaust airflow (CFM) determined by type of hood and level of duty of alliances

21

Performance Test (507.6)

- Required before final approval
  - Verifies the rate of exhaust
  - Verifies make-up airflow
  - Verifies proper operation
  - Permit holder furnishes necessary equipment

22

Capture & Containment Test (507.6.1)

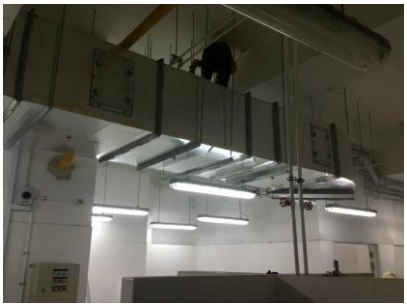
- Visual Field Test
  - Conducted with all equipment under hood operating at temp.
  - Conducted with all sources of make-up air AND all sources of recirculated air (heat, air-conditioning) operating.
  - Visual observation through use of smoke candles, smoke puffers or similar means.

23

What are some of the more significant concerns with ducts?

24

Ducts (Section 506)



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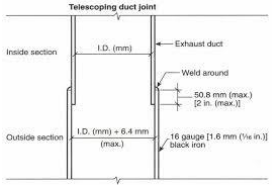
General Requirements

- Must be designed for the type of cooking appliance and hood served.
- Ducts exposed to outside are must be protected from corrosion.
- Exhaust ducts for Type I hoods must be independent of other systems.

26

Duct Construction (506.3)

- 16 gage steel or 18 gage stainless
- Joints made with continuous, external liquid-tight weld or braze.
- Joints: Butt, overlapping, welded flange



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Joint Construction Exceptions

Factory-built commercial kitchen grease ducts listed and labeled in accordance with UL 1978 and installed in accordance with the listing.

- UL 1978 covers:
  - Factory built grease ducts intended to be installed at clearances less than 18 inches.

28

Joints, Seams, Penetrations (506.3.2)

- Continuous liquid-tight weld or braze on the external surface.
  - Exceptions:
    - Where penetrations are sealed by listed devices
    - Listed and labeled factory built ducts
    - Internal welds permitted where ground smooth and provided with access for inspection.

29

Duct/Fan Connections (506.3.2.3)

- Flanged, gasketed, bolted
- Gasket materials rated for continuous duty at 1500 degrees F.

30

Grease Duct Test (AMD 506.3.2.50

- Leakage test required prior to concealment of duct.
  - Positive pressure smoke test, or
  - Air test, or
  - Water test
- Permit holder shall supply test equipment.
- All connections, seams, welds visible during test.
- Every joint must be tested.
- Approved, equivalent test may be used.

31

Must the grease duct test be witnessed by the fire inspector?

32

Duct Clearances (AMD 506.3.6)

- 18 inches to combustibles
- 3 inches to limited combustibles
  - Exceptions:
    - Factory-built, listed and labeled to UL 1978.
    - Grease duct systems listed for reduced clearances.
    - Ducts covered on all sides with a listed, labeled field applied duct enclosure material.

33

Grease Accumulation (506.3.7)

- Slope requirements
- Reservoirs
- Cleanouts
  - Tight fitting steel doors
  - Liquid tight
  - Gasketed
  - Spaced not more than 20 feet apart

34

Enclosures (506.3.11)

- Required where duct penetrates ceiling, wall, floor or any concealed space.
- Enclosed from point of penetration to outlet terminal.
- Enclosure shall only serve a single duct.
- Types:
  - Shaft Enclosure
  - Field-applied enclosure
  - Factory-built assembly

35

When is the duct enclosure required to have access openings?

36

What is the required fire rating of the opening protective?

37

Field-applied Duct Enclosure

- Tested and listed
- Provides alternative to 1 and 2 hour enclosures.
- Allows for zero clearance

VERIFY through documentation!

38

Exhaust Outlets (506.3.13)

- Roof Termination
  - Discharge opening at least 40 inches above roof surface.
- Wall Termination
  - Not through rated wall.
  - Does not create public nuisance.
  - Not within 3 feet of other openings.

39

Termination Location (506.3.13.3)

10’

Horizontally from building or property line.

Above adjoining grade level.

Horizontally and not less than 3 feet above air intake openings.

40

Exhaust Equipment (506.5)

- Discharge shall not impinge on roof or other equipment.
- Vertical fans shall have drain outlet and approved reservoir.
- Up-blast fans must be hinged, restrained.
- Duct work must extend 18 inches above roof surface.

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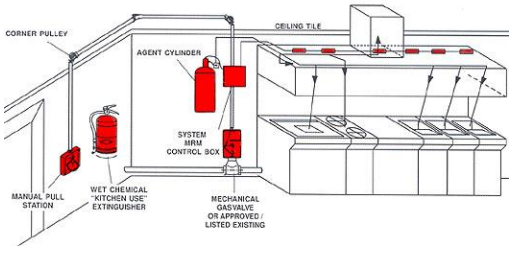
Fire Suppression System (509)



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Fire Suppression

- Required by IMC 509.1 and CFSC Part III- 904.2.2
- CFSC Part III-904.12 requires that the suppression system be tested in accordance with ANSI/UL 300.
  - Requires that the system fully extinguish a deep fat fryer fire before the agent is fully discharge and not allow re-ignition.
- Wet chemical systems, complying with NFPA 17A are typically used.

43

Does NFPA 17A require that a fire audible notification be provided of a system initiation?

44

Section 5.2.1.8 of NFPA 17A requires that audible or visual indicator be provided to show that the system has operated , that personnel response is needed, and that the system is in need of recharge.

Section 5.2.1.9 requires that the suppression system activation initiates the building fire alarm system where a fire alarm system is provided.

45

Operation (CSFPC 50.5)

- Exhaust system operated whenever cooking equipment is turned on.
- Filters must be in-place.
- Make-up air shall not be restricted.
- Cooking equipment shall not be operated when hood or suppression system is not operational.

46

Required Inspections and Tests

(Ch.7 NFPA 17A)

- Monthly inspections by the system's owner.
- Semi-annual inspections required by properly trained and qualified service technician.

47

Inspection & Testing (CSFPC 50.5.2))

- Fire extinguishing system shall be maintained every 6 months by properly trained and qualified personnel.
- All actuation and control components shall be tested.
- Fusible links shall be replaced every 6 months.

48

Cleaning

Table 50.5.4 Schedule of Inspection for Grease Buildup

Type or Volume of Cooking	Inspection Frequency
Systems serving solid fuel cooking operations	Monthly
Systems serving high-volume cooking operations, such as 24-hour cooking, charbroiling, or wok cooking	Quarterly
Systems serving moderate-volume cooking operations	Semiannually
Systems serving low-volume cooking operations, such as churches, day camps, seasonal businesses, or senior centers	Annually

[96: Table 11.4]

49

Cleaning

- When inspection shows grease deposits:
  - All components must be cleaned.
  - Flammable solvents shall not be used.
  - Cleaning chemicals shall not be applied to fusible links.
  - All access panels, etc. shall be replaced.
  - Cleaning Company shall provide a written report that also specifies areas that were inaccessible for cleaning.

50

51

Cooking Equipment (NFPA 96-11.7)

- Inspected & serviced annually.
- Grease accumulations shall be cleaned.
- Personnel inspecting and cleaning must be properly & qualified.

52

So, what do we need to look at during a routine inspection?

53

FMO Inspection

- Documentation
  - Hood Cleaning
  - Fire Suppression System test
- Check for grease build-up
  - Look behind the filters
  - Look above ceiling

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FMO Inspection

- Check positioning of cooking equipment under the fire suppression system nozzles.
  - Changes in the cook line?
- Are protective caps in place on the nozzles?
- Unprotected penetrations through hood
- Accessibility of Manual Activation Device.
- Proper fire extinguisher in place with current inspection tag?

55

Keeping Cooking Equipment in Place

56

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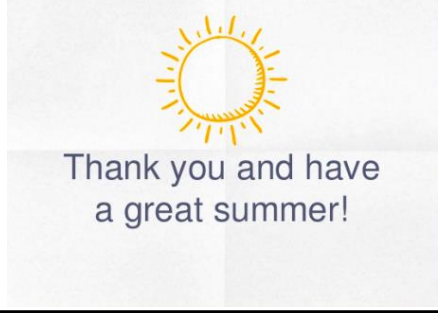
Questions?



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